

Appl. No.: 10/056,993
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Off. Act. Dated: January 14, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-2 (canceled)

3. (currently amended): ~~An apparatus as recited in claim 1, further comprising: A~~
nozzle apparatus for vacuum removal of debris, comprising:

a tubular base member capable of being attached to a conduit;

an extensible member slidably coupled to said base member;

said extensible member configured for longitudinal extension and retraction;

said extensible member having a nozzle tip;

means for extending or retracting said extensible member; and

a coupling member;

said coupling member configured for coupling said tubular base member to a conduit.

4. (original): An apparatus as recited in claim 3, wherein said base member is pivotally coupled to said coupling member.

5. (original): An apparatus as recited in claim 4, further comprising means for pivoting said base member in relation to said coupling member.

6. (original): An apparatus as recited in claim 5, wherein said means for pivoting said base member comprises a controllable actuator having a first end coupled to said base member and a second end coupled to said coupling member.

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7. (original): An apparatus as recited in claim 3, wherein said coupling member is configured to dampen and reduce the force of impact of the apparatus with a surface during use.

8. (original): An apparatus as recited in claim 3, wherein said coupling member comprises a universal joint configured for coupling said base member to a conduit.

9. (original): An apparatus as recited in claim 8, wherein said universal joint comprises:

an upper tray configured for coupling to said conduit; and
a lower tray coupled to said nozzle assembly;
said lower tray coupled to said upper tray with a plurality of resilient members;
wherein the joint between said base and a conduit is compliant.

10. (original): An apparatus as recited in claim 8, wherein said universal joint is configured to rotate axially.

11. (currently amended): ~~An apparatus as recited in claim 1, further comprising A~~
nozzle apparatus for vacuum removal of debris, comprising:

a tubular base member capable of being attached to a conduit;
an extensible member slidably coupled to said base member;
said extensible member configured for longitudinal extension and retraction;
said extensible member having a nozzle tip;
means for extending or retracting said extensible member; and
a nozzle tip coupled to said extensible member.

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12. (original): An apparatus as recited in claim 11, wherein said nozzle tip is pivotally coupled to said extensible member.

13. (original): An apparatus as recited in claim 11, wherein said nozzle tip further comprises:

a flexible tube coupled to said extensible member and having an open end; and means for changing the direction of said open end of said flexible tube.

14. (original): An apparatus as recited in claim 13, wherein said means for changing the direction of the end of said nozzle comprises:

a nozzle bracket pivotally mounted to said extensible member;

said bracket coupled to said flexible tube and mounted to a distal end of said extensible member;

said flexible tube having a nozzle mouth; and

at least one pair of long stroke controllable actuators mounted to said nozzle bracket;

wherein differential actuation of said actuators changes the direction of nozzle bracket and said end of said flexible tube.

15. (original): An apparatus as recited in claim 14, wherein said nozzle mouth is pivotally coupled to said nozzle bracket.

16. (canceled)

17. (currently amended): ~~An apparatus as recited in claim 16, further comprising:~~ A nozzle apparatus for vacuum removal of debris, comprising:
a tubular base member capable of being attached to a conduit;
an extensible member slidably coupled to said base member;

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said extensible member configured for longitudinal extension and retraction;
said extensible member having a nozzle tip;
a controllable actuator configured for extending or retracting said extensible member; and
a coupling member;
said coupling member configured for coupling said tubular base member to a conduit.

18. (original): An apparatus as recited in claim 17, wherein said base member is pivotally coupled to said coupling member.

19. (original): An apparatus as recited in claim 18, further comprising means for pivoting said base member in relation to said coupling member.

20. (original): An apparatus as recited in claim 19, wherein said means for pivoting said base member comprises a controllable actuator having a first end coupled to said base member and a second end coupled to said coupling member.

21. (original): An apparatus as recited in claim 17, wherein said coupling member is configured to dampen and reduce the force of impact of the apparatus with a surface during use.

22. (original): An apparatus as recited in claim 17, wherein said coupling member comprises a universal joint configured for coupling said base member to a conduit.

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23. (original): An apparatus as recited in claim 22, wherein said universal joint comprises:

- an upper tray configured for coupling to said conduit; and
- a lower tray coupled to said nozzle assembly;
- said lower tray coupled to said upper tray with a plurality of resilient members;
- wherein the joint between said base and a conduit is compliant.

24. (original): An apparatus as recited in claim 22, wherein said universal joint is configured to rotate axially.

25. (currently amended): ~~An apparatus as recited in claim 16, further comprising~~ A nozzle apparatus for vacuum removal of debris, comprising:
a tubular base member capable of being attached to a conduit;
an extensible member slidably coupled to said base member;
said extensible member configured for longitudinal extension and retraction;
said extensible member having a nozzle tip;
a controllable actuator configured for extending or retracting said extensible member; and
a nozzle tip coupled to said extensible member.

26. (original): An apparatus as recited in claim 25, wherein said nozzle tip is pivotally coupled to said extensible member.

27. (original): An apparatus as recited in claim 25, wherein said nozzle tip further comprises:
a flexible tube coupled to said extensible member and having an open end; and
means for changing the direction of said open end of said flexible tube.

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28. (original): An apparatus as recited in claim 27, wherein said means for changing the direction of the end of said nozzle comprises:

a nozzle bracket pivotally mounted to said extensible member;

said bracket coupled to said flexible tube and mounted to a distal end of said extensible member;

said flexible tube having a nozzle mouth; and

at least one pair of long stroke controllable actuators mounted to said nozzle bracket;

wherein differential actuation of said actuators changes the direction of nozzle bracket and said end of said flexible tube.

29. (original): An apparatus as recited in claim 28, wherein said nozzle mouth is pivotally coupled to said nozzle bracket.

30. (canceled)

31. (currently amended): ~~An apparatus as recited in claim 30,~~ A particulate matter moving apparatus, comprising:

a dexterous extensible nozzle assembly configured to be pivotally coupled to a conduit; and

means for manipulating the position of the nozzle assembly;

wherein the elevation and location of said nozzle assembly can be precisely adjusted; and

wherein said dexterous nozzle assembly further comprises a universal joint capable of coupling said nozzle assembly to a conduit.

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32. (original): An apparatus as recited in claim 31, wherein said universal joint comprises:

- an upper tray configured for mounting to a conduit;
- said upper tray having an annular channel;
- a lower tray mounted to said nozzle assembly;
- said lower tray coupled to said upper tray; and
- a plurality of flexible bearings evenly disposed within said annular channel of said upper tray;

wherein said nozzle assembly can rotate axially.

33. (currently amended): ~~An apparatus as recited in claim 30.~~ A particulate matter moving apparatus, comprising:

a dexterous extensible nozzle assembly configured to be pivotally coupled to a conduit; and

means for manipulating the position of the nozzle assembly;

wherein the elevation and location of said nozzle assembly can be precisely adjusted;

wherein said extensible nozzle assembly comprises:

- a cylindrical base;
- a fly slidably coupled to said base; and
- a nozzle tip coupled to said fly.

34. (original): An apparatus as recited in claim 33, wherein said nozzle tip further comprises:

- a flexible tube coupled to said fly and having an open end; and
- means for changing the direction of said open end of said flexible tube.

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35. (original): An apparatus as recited in claim 33, wherein said nozzle assembly further comprises a bracket pivotally connected to said fly and said nozzle tip.

36. (original): An apparatus as recited in claim 33, wherein said means for manipulating the position of the nozzle assembly comprises:
means for pivotally rotating said nozzle assembly with respect to said conduit;
means for extending and retracting said fly longitudinally from said base; and
means for changing the direction of said nozzle tip.

37. (original): An apparatus as recited in claim 36, wherein said means for pivoting said nozzle assembly comprises a controllable actuator and flange.

38. (original): An apparatus as recited in claim 36, wherein said means for extending and retracting said fly longitudinally from said base comprises:
at least one pair of long stroke cylinders having first and second ends;
said first ends mounted to said base and said second ends mounted to said fly.

39. (original): An apparatus as recited in claim 36, wherein said means for changing the direction of the nozzle tip comprises:
a nozzle bracket pivotally mounted to said fly;
said bracket coupled to a flexible tube mounted to a distal end of said fly;
said flexible tube having a nozzle mouth; and
at least one pair of long stroke cylinders having first and second ends;
said first ends mounted to said base and said second ends mounted to said nozzle bracket.

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40. (original): An apparatus as recited in claim 33, wherein said means for changing the direction of the nozzle tip comprises:
a nozzle bracket pivotally mounted to said fly;
said bracket coupled to a flexible tube mounted to a distal end of said fly;
said flexible tube having a nozzle mouth; and
at least one pair of long stroke cylinders having first and second ends;
said first ends mounted to a universal joint and said second ends mounted to said nozzle bracket.

41. (currently amended): An apparatus as recited in claim ~~30~~ 31 or 33, wherein said means for manipulating the position of the nozzle assembly comprises a controllable actuator.

42. (canceled)

43. (currently amended): ~~An apparatus as recited in claim 42, A particulate matter moving apparatus, comprising:~~
a dexterous extensible nozzle assembly configured to be pivotally coupled to a conduit; and
a controllable actuator configured for manipulating the position of the nozzle assembly;
wherein the elevation and location of said nozzle assembly can be precisely adjusted; and
wherein said dexterous nozzle assembly further comprises a universal joint capable of coupling said nozzle assembly to a conduit.

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44. (original): An apparatus as recited in claim 43, wherein said universal joint comprises:

- an upper tray configured for mounting to a conduit;
- said upper tray having an annular channel;
- a lower tray mounted to said nozzle assembly;
- said lower tray coupled to said upper tray; and
- a plurality of flexible bearings evenly disposed within said annular channel of said upper tray;

wherein said nozzle assembly can rotate axially.

45. (original): An apparatus as recited in claim 44, wherein said extensible nozzle assembly further comprises:

means for causing the axial rotation of said nozzle assembly.

46. (original): An apparatus as recited in claim 45, wherein said means for causing axial rotation of said nozzle assembly comprises:

- a set of teeth extending radially from said upper tray; and
- a motor with a sprocket configured to engage said teeth;

wherein actuation of the motor caused the axial rotation of said nozzle assembly.

47. (currently amended): ~~An apparatus as recited in claim 42,~~ A particulate matter moving apparatus, comprising:

a dexterous extensible nozzle assembly configured to be pivotally coupled to a conduit; and

a controllable actuator configured for manipulating the position of the nozzle assembly;

wherein the elevation and location of said nozzle assembly can be precisely adjusted; and

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wherein said extensible nozzle assembly comprises:

- a cylindrical base;
- a fly slidably coupled to said base;
- a nozzle tip coupled to said fly; and
- means for manipulating the position of the nozzle assembly.

48. (original): An apparatus as recited in claim 47, wherein said nozzle tip further comprises:

- a flexible tube coupled to said fly and having an open end; and
- means for changing the direction of said open end of said flexible tube.

49. (original): An apparatus as recited in claim 47, wherein said nozzle assembly further comprises a bracket pivotally connected to said fly and said nozzle tip.

50. (original): An apparatus as recited in claim 47, wherein said means for manipulating the position of the nozzle assembly comprises:
means for pivotally rotating said nozzle assembly with respect to said conduit;
means for extending and retracting said fly longitudinally from said base; and
means for changing the direction of said nozzle tip.

51. (original): An apparatus as recited in claim 50, wherein said means for manipulating the position of the nozzle assembly further comprises:
means for causing the axial rotation of said nozzle assembly.

52. (original): An apparatus as recited in claim 50, wherein said means for pivoting said nozzle assembly comprises a controllable actuator and flange.

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53. (original): An apparatus as recited in claim 50, wherein said means for extending and retracting said fly longitudinally from said base comprises:
at least one pair of long stroke cylinders having first and second ends;
said first ends mounted to said base and said second ends mounted to said fly.

54. (original): An apparatus as recited in claim 48, wherein said means for changing the direction of the nozzle tip comprises:
a nozzle bracket pivotally mounted to said fly;
said bracket coupled to a flexible tube mounted to a distal end of said fly;
said flexible tube having a nozzle mouth; and
at least one pair of long stroke cylinders having first and second ends;
said first ends mounted to said base and said second ends mounted to said nozzle bracket.

55. (original): An apparatus as recited in claim 50, wherein said means for changing the direction of the nozzle tip comprises:
a nozzle bracket pivotally mounted to said fly;
said bracket coupled to a flexible tube mounted to a distal end of said fly;
said flexible tube having a nozzle mouth; and
at least one pair of long stroke cylinders having first and second ends;
said first ends mounted to a universal joint and said second ends mounted to said nozzle bracket.

56. (original): A nozzle assembly, comprising:
an outer cylinder;
said outer cylinder having a universal joint capable of coupling said outer cylinder with a conduit;
wherein said universal joint is configured to dampen and reduce shear forces;

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an inner cylinder disposed within the outer cylinder on a plurality of support rails;
means for extending and retracting said inner cylinder with respect to said outer cylinder; and
a dexterous nozzle tip coupled to said inner cylinder.

57. (original): A nozzle assembly as recited in claim 56, wherein said universal joint further comprises:

an upper tray configured for mounting to a conduit; and
a lower tray mounted to said upper tray with a plurality of spring tensioned fasteners disposed radially around the periphery of said upper tray and said lower tray;
said lower tray pivotally coupled to said outer cylinder.

58. (original): A nozzle assembly as recited in claim 56, wherein said means for extending and retracting said inner cylinder from said outer cylinder comprises:

at least one pair of long stroke cylinders having first and second ends;
said first ends mounted to said outer cylinder and said second ends mounted to said inner cylinder.

59. (original): A nozzle assembly as recited in claim 56, wherein said dexterous nozzle tip comprises:

a nozzle bracket pivotally mounted to said fly;
said bracket coupled to a flexible tube mounted to a distal end of said inner cylinder;
said flexible tube having a nozzle mouth; and
at least one pair of long stroke cylinders mounted to said nozzle bracket;
wherein differential actuation of said long stroke cylinders pivots said nozzle bracket.

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60. (original): A nozzle assembly as recited in claim 56, wherein said means for extending and retracting said inner cylinder with respect to said outer cylinder comprises a controllable actuator.

61. (original): A nozzle assembly, comprising:
an outer cylinder;
said outer cylinder having a universal joint capable of coupling said outer cylinder with a conduit;
wherein said universal joint is configured to dampen and reduce shear forces;
an inner cylinder disposed within the outer cylinder on a plurality of support rails;
a controllable actuator configured for extending and retracting said inner cylinder with respect to said outer cylinder; and
a dexterous nozzle tip coupled to said inner cylinder.

62. (original): A nozzle assembly as recited in claim 61, wherein said universal joint further comprises:
an upper tray configured for mounting to a conduit; and
a lower tray mounted to said upper tray with a plurality of spring tensioned fasteners disposed radially around the periphery of said upper tray and said lower tray;
said lower tray pivotally coupled to said outer cylinder.

63. (original): A nozzle assembly as recited in claim 62, wherein said universal joint further comprises:
a plurality of flexible bearings evenly disposed within an annular channel of said upper tray;
wherein said nozzle assembly can rotate axially.

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64. (original): An apparatus as recited in claim 63, wherein said nozzle assembly further comprises:

means for causing the axial rotation of said nozzle assembly.

65. (original): An apparatus as recited in claim 64, wherein said means for causing axial rotation of said nozzle assembly comprises:

a set of teeth extending radially from said upper tray; and

a motor with a sprocket configured to engage said teeth;

wherein actuation of the motor caused the axial rotation of said nozzle assembly.

66. (original): A nozzle assembly as recited in claim 61, wherein said controllable actuator for extending and retracting said inner cylinder from said outer cylinder comprises:

at least one pair of long stroke cylinders having first and second ends;

said first ends mounted to said outer cylinder and said second ends mounted to said inner cylinder.

67. (original): A nozzle assembly as recited in claim 61, wherein said dexterous nozzle tip comprises:

a nozzle bracket pivotally mounted to said fly;

said bracket coupled to a flexible tube mounted to a distal end of said inner cylinder;

said flexible tube having a nozzle mouth; and

at least one pair of long stroke cylinders mounted to said nozzle bracket;

wherein differential actuation of said long stroke cylinders pivots said nozzle bracket.

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68. (original): A vacuum nozzle assembly, comprising:
a cylindrical base;
a universal joint configured for coupling said cylindrical base to an intake conduit;
said universal joint having an upper tray configured for mounting to said intake conduit;
said upper tray having an annular channel;
said upper tray having a plurality of teeth;
a motor having a gear operably engaging said teeth of said upper tray;
a lower tray mounted to said cylindrical base;
a plurality of flexible bearings evenly disposed within said annular channel of said upper tray;
a plurality of spring tensioned fasteners disposed radially around the periphery of said upper tray tube and said lower tray;
a fly slidably coupled to said cylindrical base;
said fly disposed within the cylindrical base on a plurality of support rails;
a nozzle bracket pivotally mounted to said fly;
said bracket coupled to a flexible tube mounted to a distal end of said inner cylinder;
said flexible tube having a nozzle mouth; and
at least one pair of long stroke cylinders having first and second ends;
said first ends mounted to said cylindrical base and said second ends mounted to said nozzle bracket;
said long stroke cylinders configured for actuation by a user.